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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/779,686	02/09/2001	Kenji Nishi	110157.98	7206

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OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

EXAMINER

MATHEWS, ALAN A

ART UNIT	PAPER NUMBER
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2851

DATE MAILED: 04/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/779,686

Applicant(s)

NISHI, KENJI

Examiner

Alan A. Mathews

Art Unit

2851

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 35-37,39-50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 35-37,39-41 and 50 is/are allowed.
- 6) ☒ Claim(s) 42-49 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 February 2001 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 08/377,504.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 12.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Terminal Disclaimer

1. The terminal disclaimer filed on January 27, 2003, has been reviewed and is accepted.

The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 42-49 are rejected under 35 U.S.C. 102(a) as being anticipated by the Japanese patent document JP-A-4-235558 (cited on Applicant's PTO-1449 filed November 26, 2002). Figure 6 of the Japanese patent document JP-A-4-235558 and page 3, lines 5-26, and page 4, lines 1-16, of the corresponding partial translation disclose the basic configuration of a reflection-mirror-type projection exposure apparatus (see page 3, line 5, 10, 24, and page 4, line 1, for the use of the term "projection"). Page 3, line 25, and page 4, lines 1-4, disclose that the mask (first object) and substrate (second object) must move simultaneously. Figures 1, 2, and 3 and page 9, lines 8-25, and page 10, disclose a first object (mask) 31 on a movable body 29

(second θ -table) and 27 (second Y-stage) which is on scanning stage 11. Element 25 is the second object (substrate 25). Figure 2 discloses a first and second interferometer systems 57 and 62 (see page 13, lines 18-25, and page 14, lines 4-17). The measurement axis passes through a substantial center or an irradiation region of the exposure beam as seen in figure 2. With respect to claims 44, 45, and 49, element 29 is the θ -table which is rotatable.

Claim Rejections - 35 USC § 103

4. Claims 42-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruning et al. (U. S. Patent No. 5,281,996) in view of the Japanese patent document 62-150721 (cited in Applicant's PTO-1449 filed November 26, 2002). Bruning et al. discloses in figure 1, figure 7, and column 6, lines 6-17, a scanning form of the invention where the first object 13 (mask or reticle) is moved at the same time that a second object 16 (wafer) is moved. Element 11 is the projection system. Element 12 is the movable body (reticle stage) that holds the first object 13 and is movable in said predetermined direction. It is further noted that reticle stage is movable in both the X and Y directions (see column 5, lines 4-8). An interferometer system 17 is optically connected to the movable body 12 and monitors movement of the mask stage 12 and the wafer stage 15. Thus, Bruning et al. discloses the invention except for specifically disclosing that interferometer system has a measurement axis passing through a substantial center of an irradiation region of the exposure beam and which measures positional information of the movable body relating to a direction intersecting with the predetermined direction. The Japanese patent document 62-150721 discloses in figure 1 an interferometer system for a mask stage 1 that

that has a measurement axis passing through a substantial center of an irradiation region of the exposure beam and which measures positional information of the movable body relating to a direction intersecting with a predetermined direction for the purpose of better control of the mask and more accurate imaging which results in a more accurate wafer product. It is noted that “a substantial center of an irradiation region” is a broad limitation, but even interpreting the expression narrowly, the Japanese patent document 62-150721 still discloses this on the top part of figure 1 at elements 21, 23, 25 and lines XB and YB. Figure 1 discloses multiple measurement axes. With respect to claim 43, part of this interferometer system could be considered a second interferometer system. With respect to claims 44 and 49, figure 4 of the Japanese patent document 62-150721 discloses measuring rotation. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to Bruning et al. with an interferometer system having a measurement axis passing through a substantial center of an irradiation region of the exposure beam and which measures positional information of the movable body relating to a direction intersecting with the predetermined direction in view of the Japanese patent document 62-150721 for the purpose of better control of the mask and more accurate imaging which results in a more accurate wafer product.

Allowable Subject Matter

5. Claims 35-37, 39-41, and 50 are allowed. The reasons for the indicated allowance of the claims are as follows:

The prior art of record does not disclose or suggest a scanning exposure method wherein, after finishing the exposure, moving a second object in a direction perpendicular to the predetermined direction while moving the second object in a direction parallel to the predetermined direction in combination with the other steps recited in independent claim 35.

The prior art of record does not disclose or suggest a scanning exposure method wherein, after finishing the exposure, accelerating the second object in a direction intersecting the predetermined direction while decelerating the second object in the predetermined direction in combination with the other steps recited in independent claim 36.

The prior art of record does not disclose or suggest a scanning exposure method having a second step of decelerating the second object in the predetermined direction after finishing the exposure, and a third step of accelerating the second object in a reverse direction to the predetermined direction after the second step, and a fourth step of accelerating and decelerating the second object in a direction intersecting with the

predetermined direction during the second step and the third step in combination with the other steps in independent claim 37.

The prior art of record does not disclose or suggest a scanning exposure method in which, after finishing the exposure, moving the second object in a direction parallel and perpendicular to said second direction simultaneously while decelerating the first object in the first direction in combination with the other steps recited in independent claim 39.

The prior art of record does not disclose or suggest a scanning exposure method having a second step of decelerating the second object in the second direction after finishing the first step, and a third step of accelerating the second object in a reverse direction to the second direction after the second step, and a fourth step of decelerating the first object and setting the first object to a reference position during the second and third step in combination with the other steps recited in independent claim 40.

The prior art of record does not disclose or suggest a scanning exposure method wherein, after finishing the exposure, starting accelerating the second object in a reverse direction to the predetermined direction for preparing a scanning exposure onto a next defined region while moving the second object in a direction intersecting with the predetermined direction in combination with the other steps recited in independent claim 41.

The prior art of record does not disclose or suggest a controller functionally connected to a first interferometer system, a second interferometer system, a first drive mechanism, and a second drive mechanism, which converts positional information in the second direction of the second movable stage outputted from the second interferometer system to first speed information and speed controls the second drive mechanism so that the first speed information may correspond to a constant speed V , and which converts positional information in the first direction of the first movable stage outputted from the first interferometer system to second speed information and speed controls the first drive mechanism so that the second speed information may correspond to a constant speed V/β , where β is a projection magnification of the image of the pattern on the first object projected by a projection optical system in combination with the other elements recited in independent claim 50.

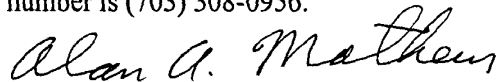
Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The patents on Applicant's PTO 1449 are cited for the same reasons Applicant cited them in his INFORMATION DISCLOSURE STATEMENT.
7. Applicant is reminded that any amendment to the claims in response to this office action will require a supplemental reissue declaration.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan A. Mathews whose telephone number is (703) 308-1706. The examiner can normally be reached on Monday through Friday from 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Russ Adams can be reached on (703) 308-2847. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Alan A. Mathews
Primary Examiner
Art Unit 2851

AAM
April 18, 2003